FIG. 1B

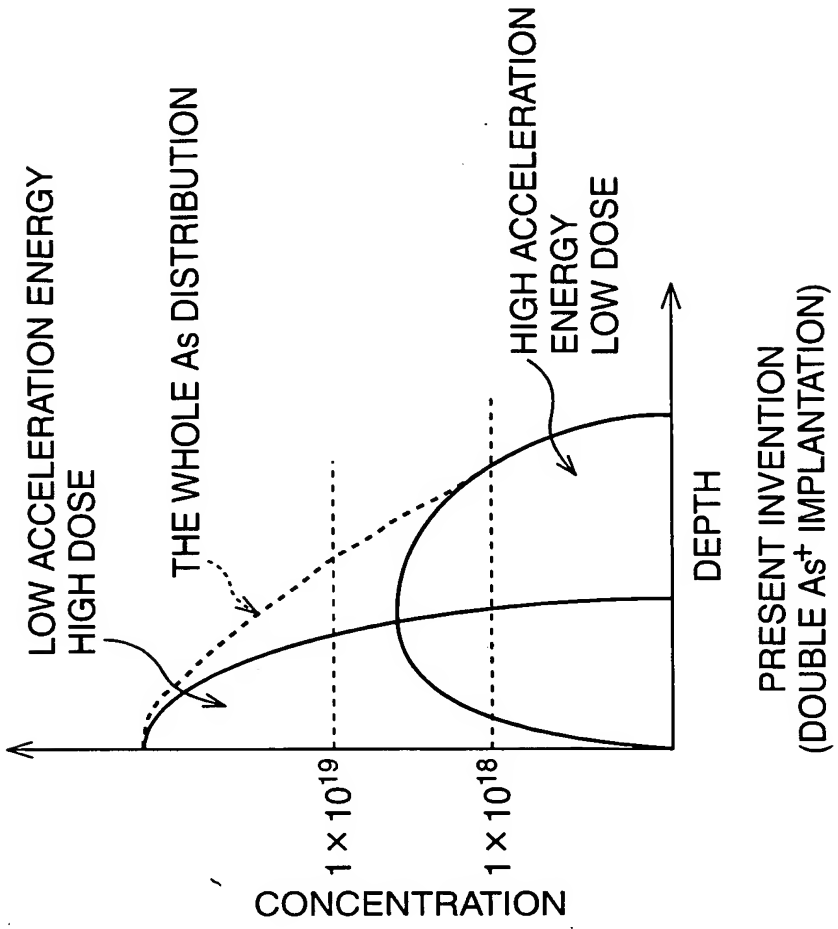

LOW ACCELERATION ENERGY
HIGH DOSE
THE WHOLE As DISTRIBUTION
HIGH ACCELERATION
ENERGY
LOW DOSE
DEPTH
PRESENT INVENTION
(DOUBLE As+ IMPLANTATION)
1 × 10^19
1 × 10^18
CONCENTRATION

FIG. 1A

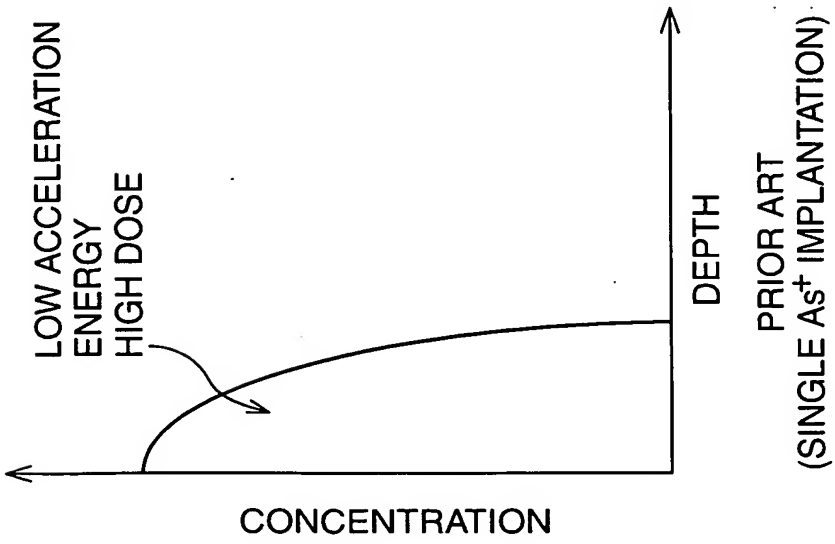
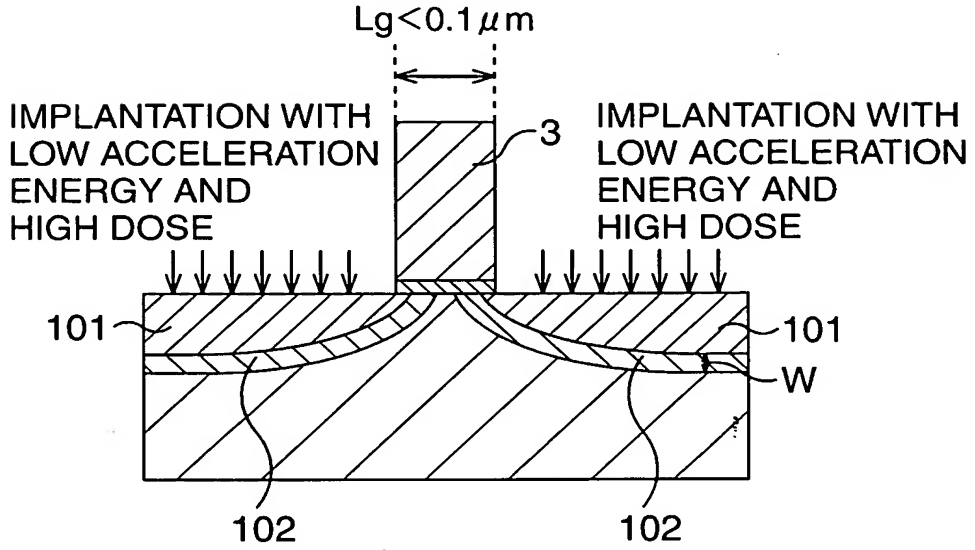
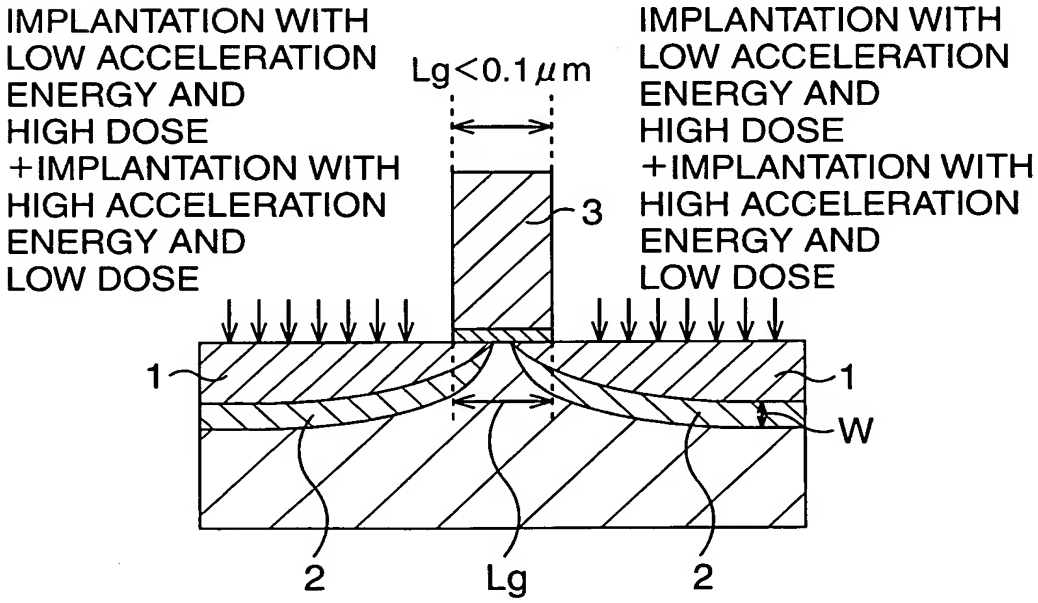

LOW ACCELERATION
ENERGY
HIGH DOSE
DEPTH
PRIOR ART
(SINGLE As+ IMPLANTATION)
CONCENTRATION

FIG. 2A



PRIOR ART

FIG. 2B



PRESENT INVENTION

FIG. 3

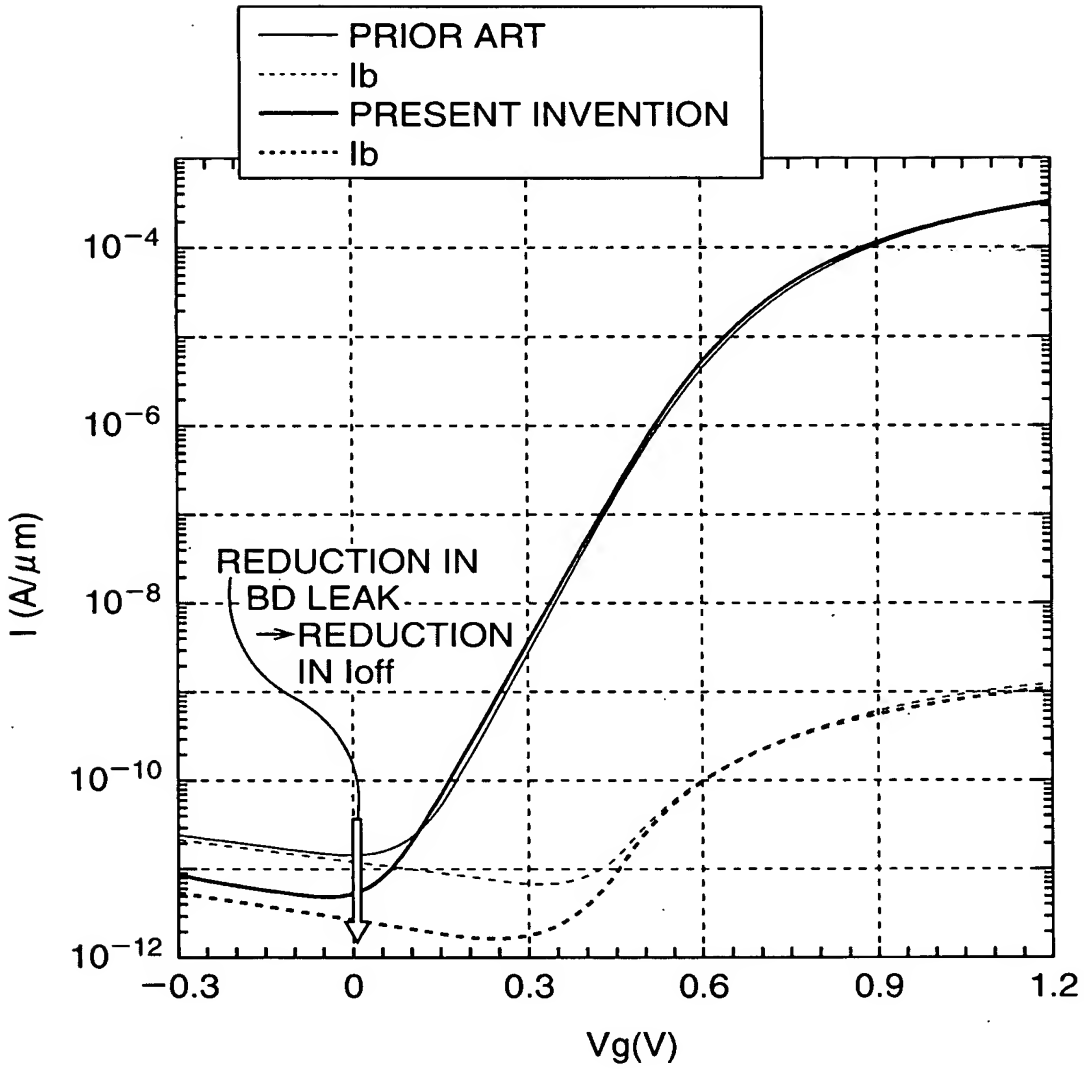

PRIOR ART
Ib
PRESENT INVENTION
Ib
10^{-4}
10^{-6}
10^{-8}
10^{-10}
10^{-12}
I (A/μm)
REDUCTION IN
BD LEAK
→REDUCTION
IN Ioff
−0.3
0
0.3
0.6
0.9
1.2
Vg(V)

FIG. 4A

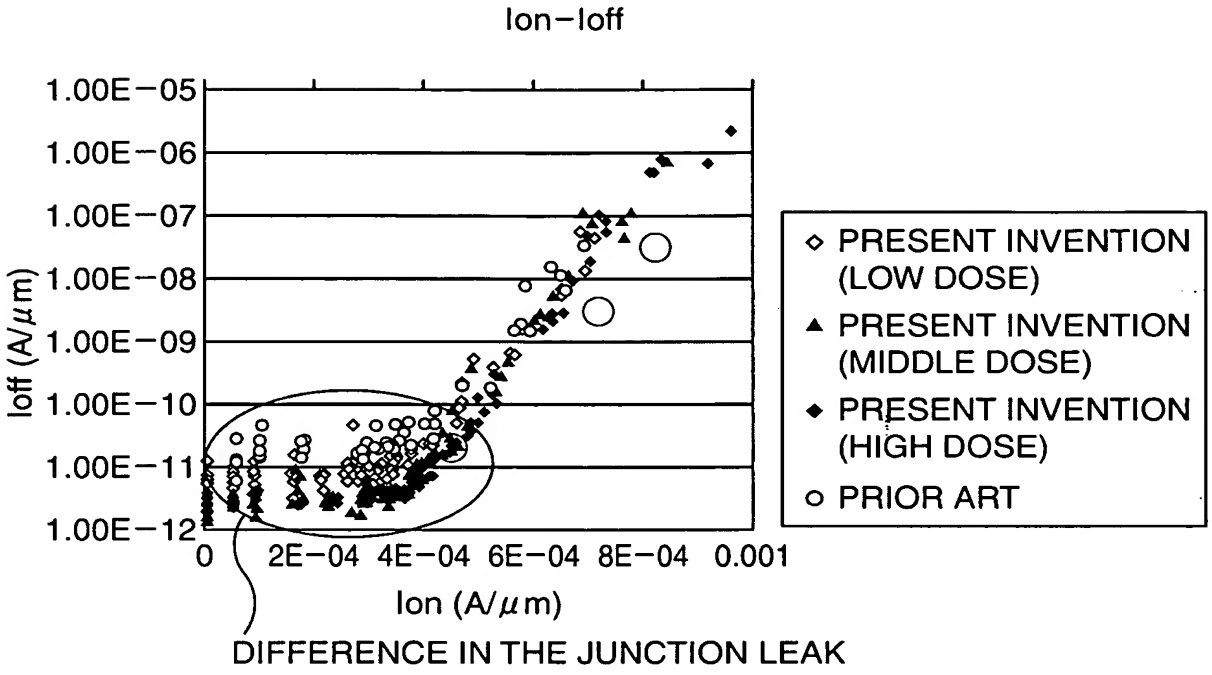

Ion−Ioff
1.00E−05
1.00E−06
1.00E−07
1.00E−08
1.00E−09
1.00E−10
1.00E−11
1.00E−12
Ioff (A/μm)
0
2E−04
4E−04
6E−04
8E−04
0.001
Ion (A/μm)
DIFFERENCE IN THE JUNCTION LEAK
PRESENT INVENTION (LOW DOSE)
PRESENT INVENTION (MIDDLE DOSE)
PRESENT INVENTION (HIGH DOSE)
PRIOR ART

FIG. 4B

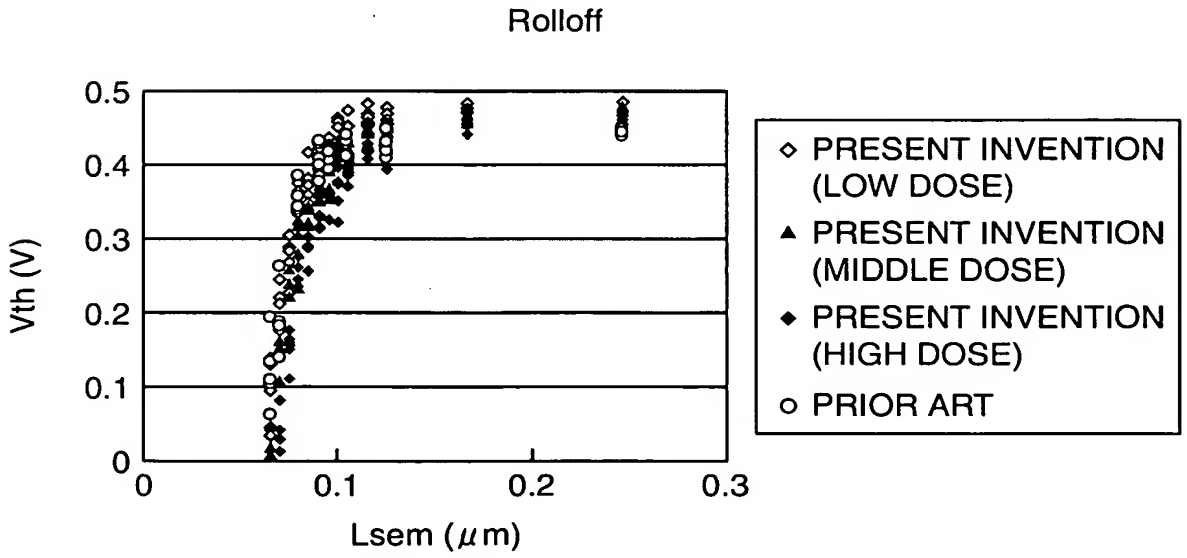
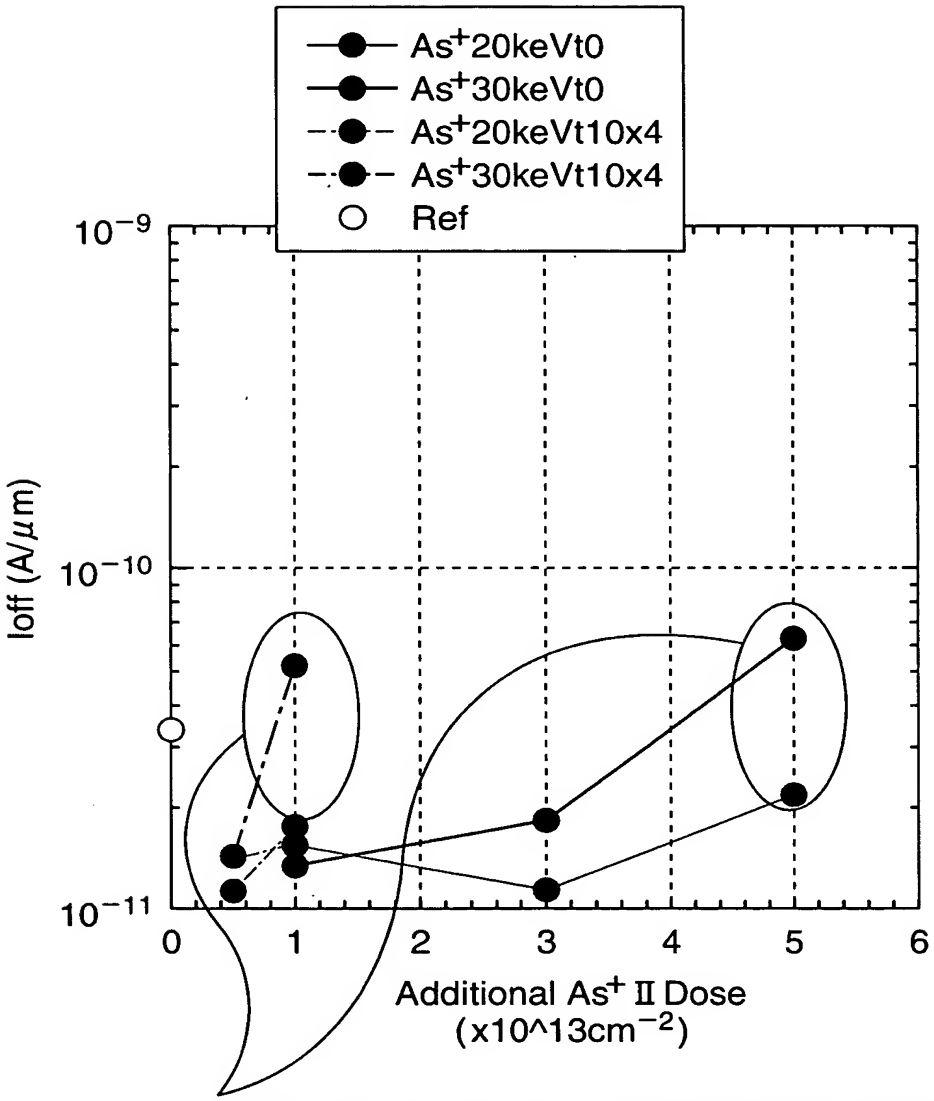

Rolloff
0.5
0.4
0.3
0.2
0.1
0
Vth (V)
0
0.1
0.2
0.3
Lsem (μm)
PRESENT INVENTION (LOW DOSE)
PRESENT INVENTION (MIDDLE DOSE)
PRESENT INVENTION (HIGH DOSE)
PRIOR ART

FIG. 5



INCREASE IN Ioff DUE TO DEGRADATION IN ROLL-OFF CHARACTERISTIC
Lg=80nm
Vd=1.2V

FIG. 6A

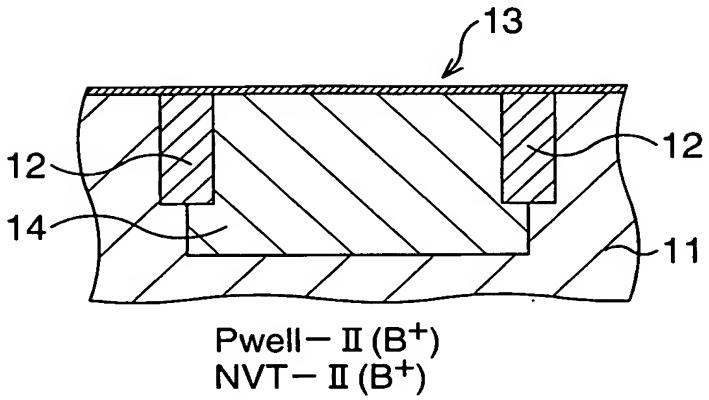


FIG. 6B

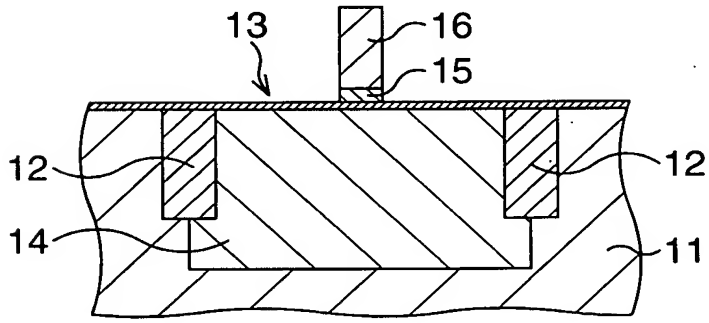


FIG. 6C

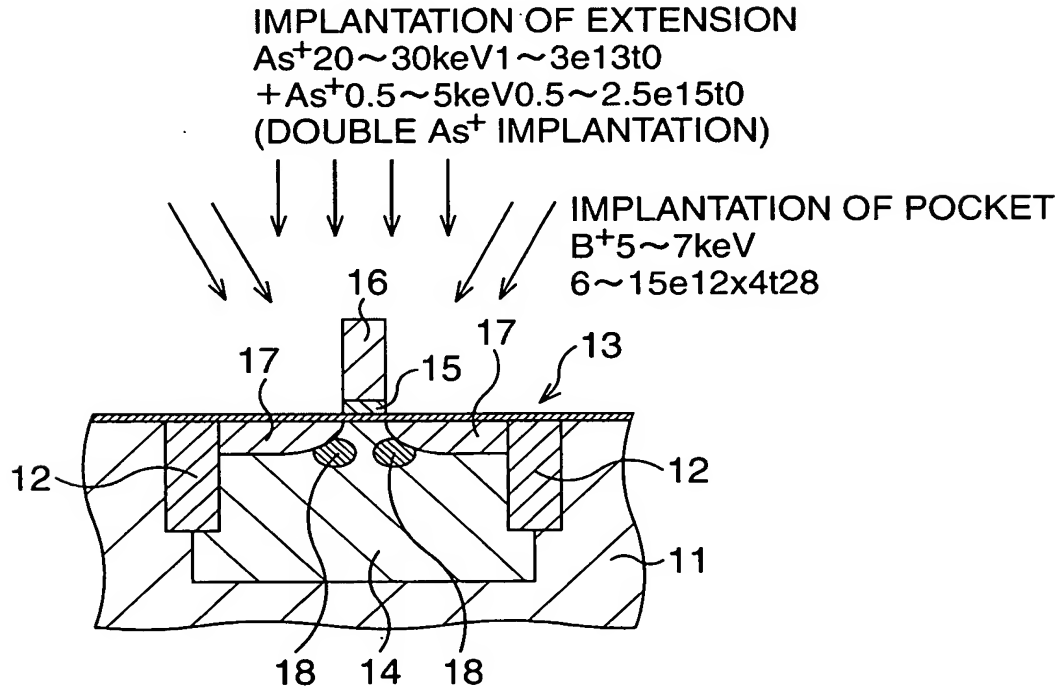


FIG. 7A

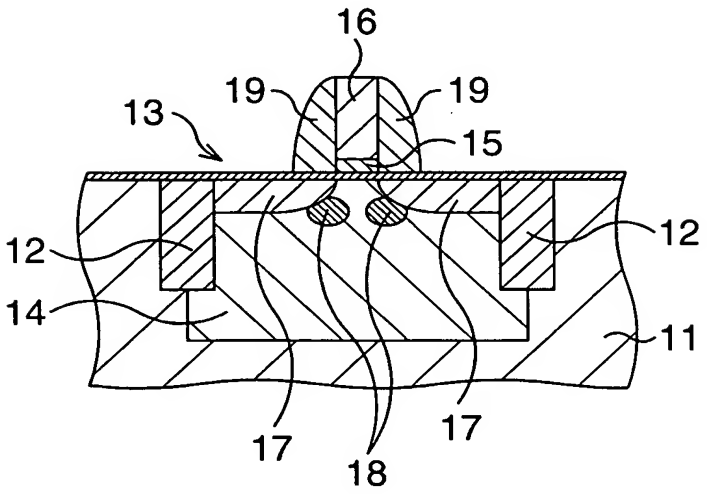

16
19
19
13
15
12
12
14
11
17
17
18

FIG. 7B

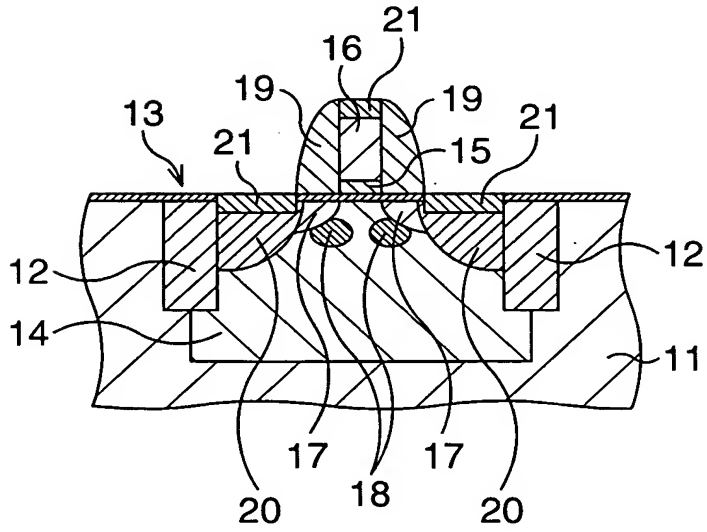

21
16
19
19
13
21
21
15
12
12
14
11
17
17
20
18
20

FIG. 8

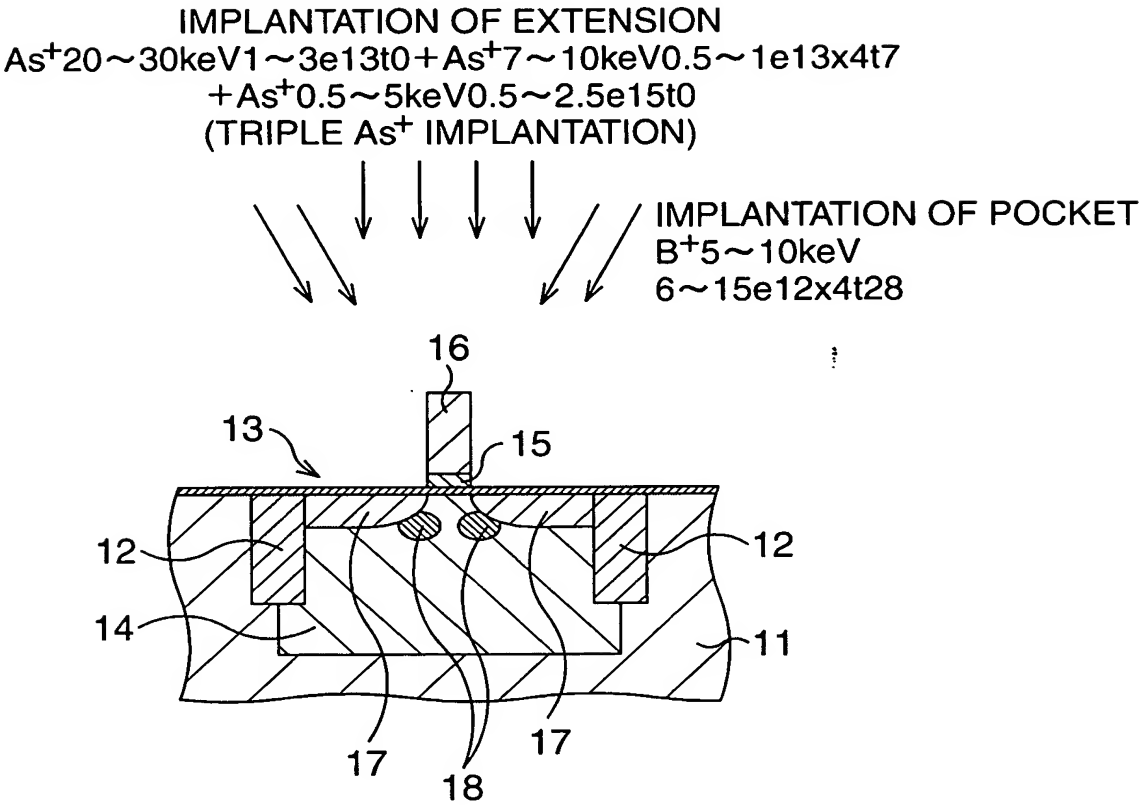
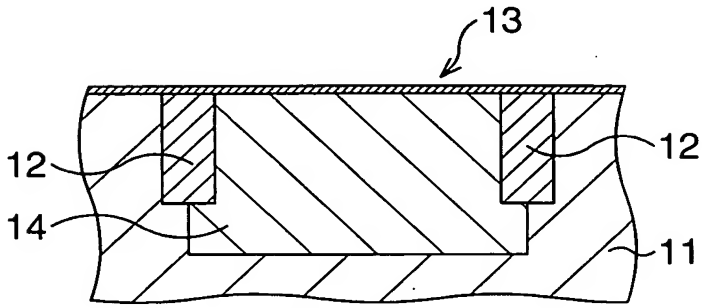

IMPLANTATION OF EXTENSION
As+20~30keV1~3e13t0+As+7~10keV0.5~1e13x4t7
+As+0.5~5keV0.5~2.5e15t0
(TRIPLE As+ IMPLANTATION)
IMPLANTATION OF POCKET
B+5~10keV
6~15e12x4t28
16
13
15
12
12
14
11
17
17
18

FIG. 9A



Pwell－Ⅱ(B^+)
NVT－Ⅱ(B^+)

FIG. 9B

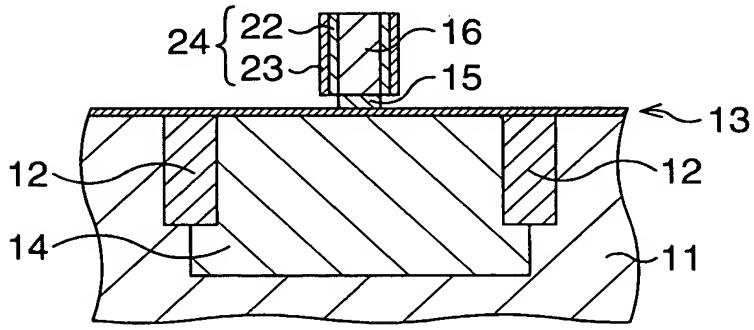


FIG. 9C

IMPLANTATION OF EXTENSION
As^+20～30keV1～3e13t0
＋As^+0.5～5keV0.5～2.5e15t0
(DOUBLE As^+ IMPLANTATION)

IMPLANTATION OF POCKET
B^+7～10keV
6～15e12x4t28

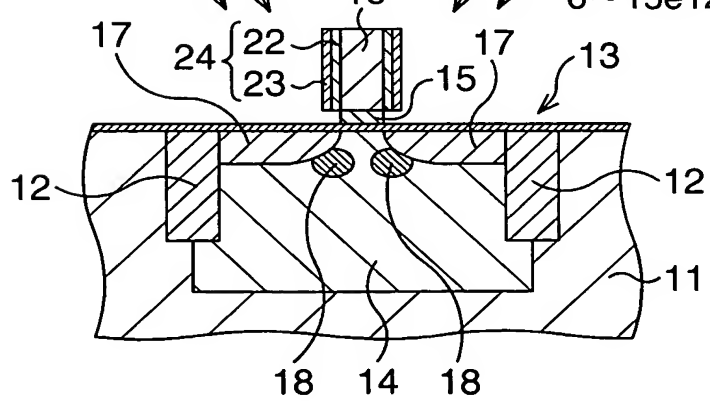


FIG. 10A

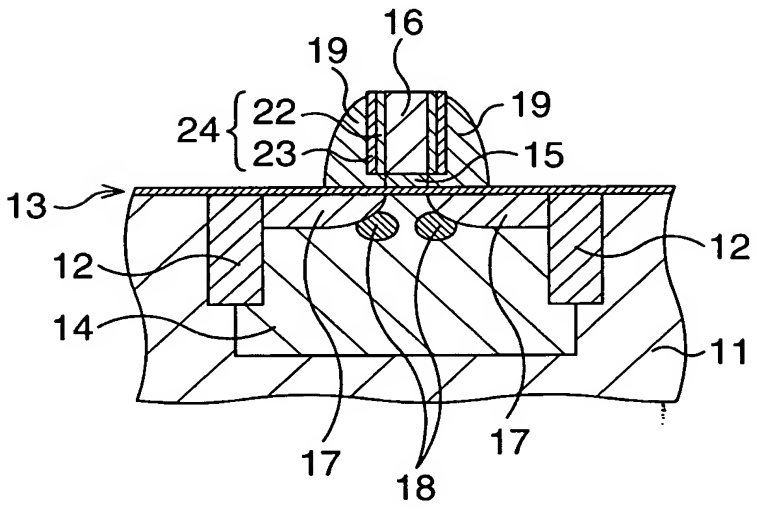


FIG. 10B

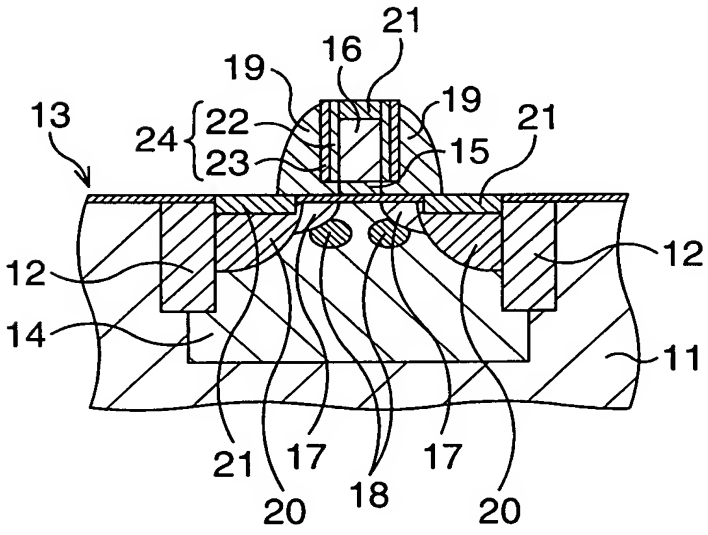
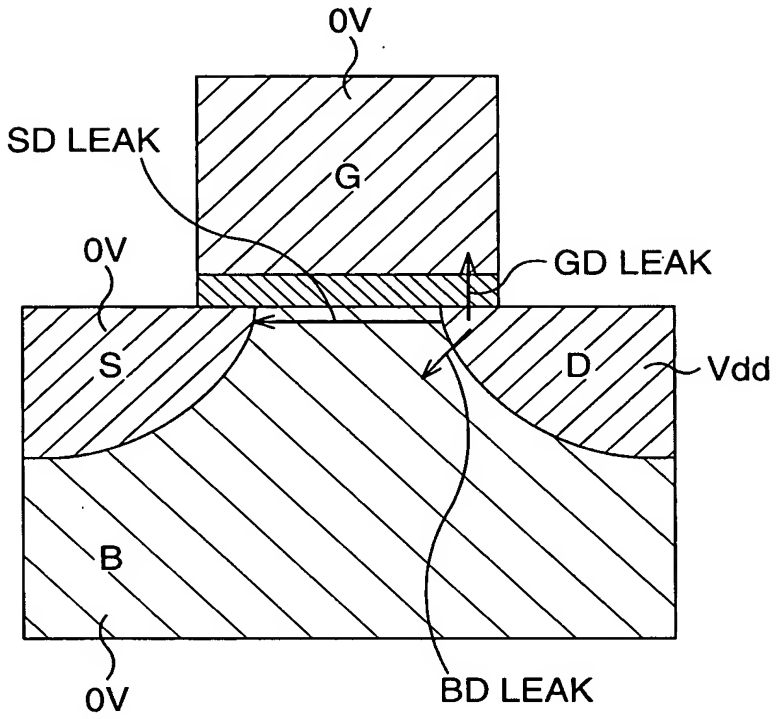


FIG. 11



Ioff=GD LEAK+SD LEAK+BD LEAK

FIG. 12

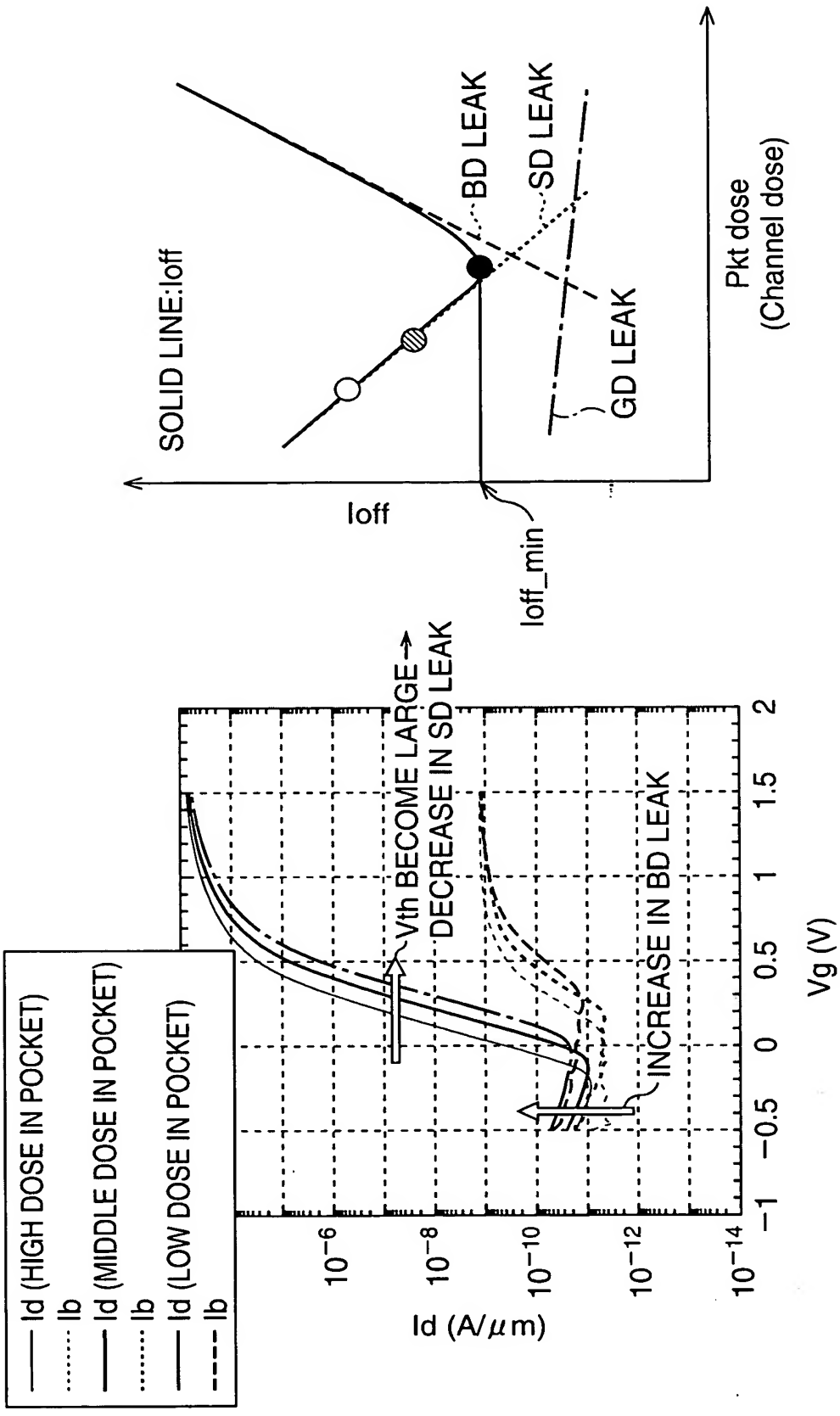
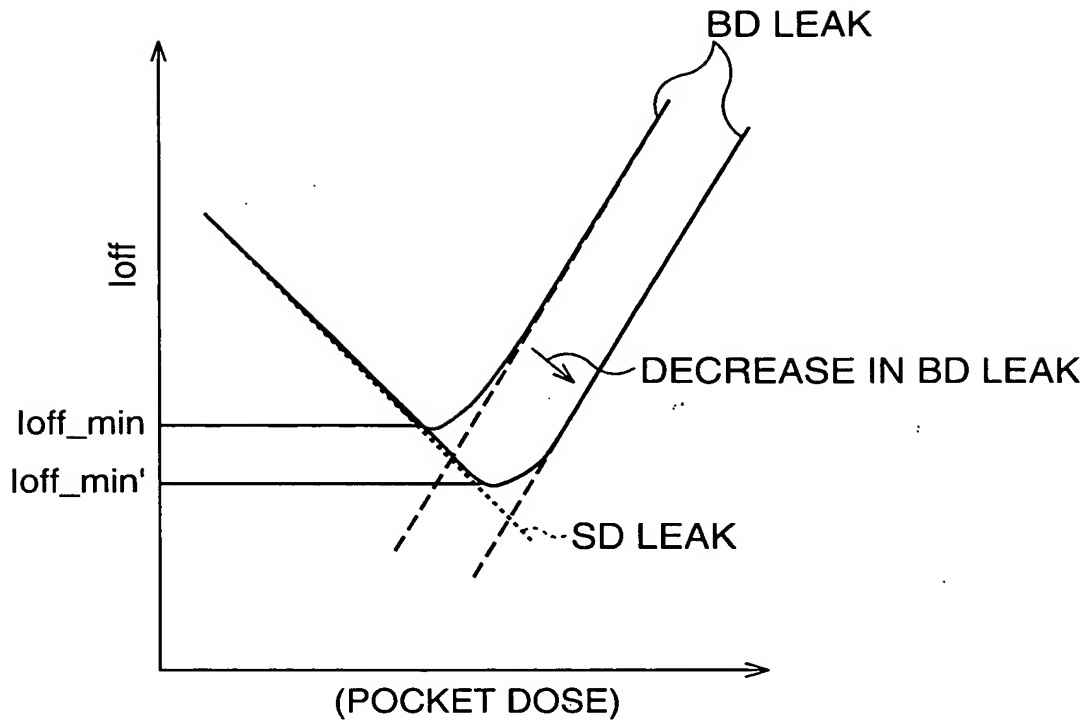

SOLID LINE:Ioff
BD LEAK
SD LEAK
GD LEAK
Pkt dose
(Channel dose)
Ioff
Ioff_min
Id (HIGH DOSE IN POCKET)
Ib
Id (MIDDLE DOSE IN POCKET)
Ib
Id (LOW DOSE IN POCKET)
Ib
Vth BECOME LARGE→
DECREASE IN SD LEAK
INCREASE IN BD LEAK
Id (A/μm)
Vg (V)
10^-6
10^-8
10^-10
10^-12
10^-14
-1
-0.5
0
0.5
1
1.5
2

FIG. 13


BD LEAK
Ioff
DECREASE IN BD LEAK
Ioff_min
Ioff_min'
SD LEAK
(POCKET DOSE)